

DESCRIPTION

HEARING AID CLEANER

Technical Field

- [001] The present invention relates to a cleaning device for removing earwax which adheres to a signal outputting portion of a hearing aid.

Background Art

- [002] An in-the-ear hearing aid is provided with an earwax guard tip having a number of small holes which serves as a filter in a signal outputting portion so as to prevent earwax from entering the inside of the hearing aid. However, when earwax adheres to the earwax guard tip, performance of the hearing aid is deteriorated, and when the amount of the adhering earwax increases, there is a strong likelihood that the earwax will cause the hearing aid to malfunction (See Document 1).

- [003] Conventionally, an in-the-ear hearing aid is provided with a brush, as an accessory, for cleaning the whole hearing aid. Since it is difficult to remove earwax from an earwax guard tip, an in-the-ear hearing aid also is provided with a spare earwax guard tip and a tool for replacing the earwax guard tip (See Document 2).

Document 1: Japanese Patent Application Publication H07-131898

Document 2: Japanese Patent Application Publication 2002-520964

Disclosure of the Invention

- [004] However, since the brush prepared as an accessory is not for cleaning earwax, it is not easy to remove earwax which adheres to the earwax guard tip. It is especially hard for elderly users to clean a small sound emission port of an in-the-ear hearing aid with a general-purpose brush because it requires careful work by hand.

- [005] In addition, even if a spare earwax guard tip and a replacing tool are prepared, the earwax guard tip is so hard to handle that a user cannot replace it on his/her own. Consequently, the user has to go to a store or a service center to have it replaced.

- [006] In order to solve the above-mentioned problems, the present invention aims at providing a hearing aid cleaner which enables users to easily remove earwax from an earwax guard tip so as to dispense with replacing the earwax guard tip.
- [007] According to a first aspect of the present invention, there is provided a device for removing earwax which adheres to a signal outputting portion of a hearing aid, comprising a brush provided in a case.
- [008] According to a second aspect of the present invention, there is provided a device for removing earwax which adheres to a signal outputting portion of a hearing aid, comprising a brush provided in a case and a liquid retaining member for retaining a cleaning liquid also provided in a case.
- [009] According to a third aspect of the present invention, in the device of the second aspect, the brush and the liquid retaining member are provided in different cases or in a single case.
- [010] According to a fourth aspect of the present invention, in the device of the second aspect, the case for the brush forms an upper case and the case for the liquid retaining member forms a lower case so as to become a unitary case.
- [011] According to a fifth aspect of the present invention, there is provided a device for removing earwax which adheres to a signal outputting portion of a hearing aid, comprising a brush provided in a case, the brush comprising a hair structure arranged in a liquid retaining member for retaining a cleaning liquid.
- [012] According to a sixth aspect of the present invention, in the device of the first, the second, or the fifth aspect, the case for the brush is fixed to a vibration driving means so as to undergo vibration, rotating movement, reciprocating movement or two-dimensional movement.
- [013] According to a seventh aspect of the present invention, the device of the first, the second, or the fifth aspect employs a hearing aid drying case or a hearing aid carrying case.
- [014] According to an eighth aspect of the present invention, there is provided a device for removing earwax which adheres to a signal outputting portion of a hearing aid, comprising a case which is constructed of a case body and a lid, and a brush which

is provided in the case body and/or the lid.

[015] According to the ninth aspect of the present invention, in the device of the eighth aspect, an anti-slip member is provided in the outer top surface of the lid and/or the outer bottom surface of the case body.

[016] According to the tenth aspect of the present invention, in the device of the eighth or the ninth aspect, an anti-slip member is provided in the outer peripheral surface of the case body.

[017] According to the eleventh aspect of the present invention, in the device of the eighth, the ninth, or the tenth aspect, the case body is divided into a brush accommodating section and a cleaning member accommodating section.

Effect of the Invention

[018] As mentioned above, according to the first aspect of the present invention, it is possible to remove earwax from the earwax guard tip. Also, it is possible to dispense with difficult work of replacing the earwax guard tip. In addition, since the signal outputting portion of the hearing aid faces downward, it is possible to prevent the earwax removed from the earwax guard tip from entering the inside of the hearing aid through the earwax guard tip.

[019] According to the second aspect of the present invention, it is possible to easily remove difficult earwax from the earwax guard tip due to both the cleaning liquid and the brush. Also, it is possible to dispense with difficult work of replacing the earwax guard tip. In addition, since the sound emission port of the hearing aid faces downward, it is possible to prevent the earwax removed from the earwax guard tip from entering the inside of the hearing aid through the earwax guard tip.

[020] According to the third aspect of the present invention, if the brush and the liquid retaining member are provided in different cases, it is possible to select a state where the liquid retaining member is used or a state where the liquid retaining member is not used. Alternatively, if the brush and the liquid retaining member are provided in a single case, it is possible to efficiently conduct cleaning work using the liquid retaining member.

[021] According to the fourth aspect of the present invention, since the case for the brush forms an upper case and the case for the liquid retaining member forms a lower case so as to become a unitary case, easy maintenance and user-friendliness can be achieved.

[022] According to the fifth aspect of the present invention, since the brush is comprised of a hair structure arranged in the liquid retaining member, earwax adhering to the signal outputting portion can be removed easily while being soaked with disinfecting alcohol by applying the signal outputting portion of the hearing aid to the brush and moving back and forth, left and right, or circularly,

[023] According to the sixth aspect of the present invention, since the brush undergoes vibration, rotating movement, reciprocating movement or two-dimensional movement, earwax adhering to the signal outputting portion can be removed quickly.

[024] According to the seventh aspect of the present invention, by using a hearing aid drying case or a hearing aid carrying case, easy maintenance and user-friendliness can be achieved.

[025] According to the eighth aspect of the present invention, it is possible to easily remove difficult earwax from the earwax guard tip by using the brush provided in the case body and/or the lid. Also, it is possible to dispense with difficult work of replacing the earwax guard tip. In addition, since the signal outputting portion of the hearing aid faces downward, it is possible to prevent the earwax removed from the earwax guard tip from entering the inside of the hearing aid through the earwax guard tip. In particular, this is effective for elderly users who are not good at delicate work.

[026] According to the ninth aspect of the present invention, with the provision of the anti-slip member attached to the outer top surface of the lid and the outer bottom surface of the case body, it is possible to steadily conduct removal of earwax adhering to the earwax guard tip in a state where the lid or the case body is prevented from slipping on the surface of a table on which the lid and/or the case body are put.

[027] According to the tenth aspect of the present invention, a user can surely hold the case body, so that the user can steadily conduct removal of earwax even while holding the case.

[028] According to the eleventh aspect of the present invention, it is possible to efficiently conduct removal of earwax with both the brush and the cleaning member such as sponge or cotton absorbing a cleaning liquid such as disinfecting alcohol.

Brief Description of the Drawings

[029] FIG. 1 is a perspective view of a device for removing earwax according to a first embodiment of the present invention;

[030] FIG. 2 is a perspective view of a device for removing earwax according to a second embodiment of the present invention;

[031] FIG. 3 is a perspective view of a device for removing earwax according to a third embodiment of the present invention, in which FIG. 3 (a) shows an example of dividing a case in the center by a partition plate, and FIG. 3 (b) shows an example of forming a brush in a doughnut shape onto a liquid retaining member;

[032] FIG. 4 is a perspective view of a device for removing earwax according to a fourth embodiment of the present invention;

[033] FIG. 5 is a perspective view of a device for removing earwax according to a fifth embodiment of the present invention;

[034] FIG. 6 is a perspective view of a device for removing earwax according to a sixth embodiment of the present invention;

[035] FIG. 7 shows a device for removing earwax according to a seventh embodiment of the present invention, in which FIG. 7 (a) is a perspective view, FIG. 7 (b) is a plan view, and FIG. 7 (c) is a cross-sectional view;

[036] FIG. 8 is a perspective view showing the rotating state of the brush;

[037] FIG. 9 is a perspective view of a device for removing earwax according to an eighth embodiment of the present invention;

[038] FIG. 10 is a perspective view of a device for removing earwax according to a ninth embodiment of the present invention;

[039] FIG. 11 is a perspective view of a device for removing earwax according to a tenth embodiment of the present invention; and

[040] FIG. 12 is a perspective view of a device for removing earwax according to an

eleventh embodiment of the present invention.

Best Mode for Carrying Out the Invention

[041] Embodiments of the present invention will now be described with reference to the attached drawings. FIG. 1 is a perspective view of a first embodiment of the present invention, FIG. 2 is a perspective view of a second embodiment of the present invention, FIG. 3 is a perspective view of a third embodiment of the present invention, FIG. 4 is a perspective view of a fourth embodiment of the present invention, FIG. 5 is a perspective view of a fifth embodiment of the present invention, FIG. 6 is a perspective view of a sixth embodiment of the present invention, FIG. 7 shows a seventh embodiment of the present invention, FIG. 8 is a perspective view showing the rotating state of the brush, FIG. 9 is a perspective view of an eighth embodiment of the present invention, FIG. 10 is a perspective view of a ninth embodiment of the present invention, FIG. 11 is a perspective view of a tenth embodiment of the present invention, and FIG. 12 is a perspective view of an eleventh embodiment of the present invention.

[042] As shown in FIG. 1, the first embodiment of the device for removing earwax is comprised of a cylindrical case 1 having a bottom, and a brush 2 accommodated in the case 1. The brush 2 is formed by arranging a hair structure on a base member 2a.

[043] Instead of providing the case 1 and the brush 2 separately, the brush 2 may be formed by arranging a hair structure directly on the bottom surface of the case 1. Also, a flexible member (not shown in the drawing) may be provided between the bottom surface of the case 1 and the brush 2 to serve as a cushion.

[044] An earwax guard tip C is installed in a sound emission port of an in-the-ear hearing aid H, and the hair structure of the brush 2 is made of a fine member so as to remove earwax which adheres to small holes of the earwax guard tip. The hair structure of the brush 2 has an appropriate length so as not to enter the inside of the in-the-ear hearing aid H more than needed through the holes of the earwax guard tip C. The hair structure of the brush 2 also has appropriate strength so as not to exert more force than needed to the earwax guard tip C.

[045] In order to remove earwax from the earwax guard tip C, a user holds the

in-the-ear hearing aid H, applies the earwax guard tip C to the brush 2 from above, and rubs the earwax guard tip C against the brush 2 while moving the hearing aid H back and forth, left and right, or circularly.

[046] In this instance, since the sound emission port of the hearing aid H faces downward, it is possible to prevent the earwax removed from the earwax guard tip C from entering the inside of the hearing aid H through the earwax guard tip C. Also, if a flexible member is provided between the bottom surface of the case 1 and the brush 2, it is possible to prevent excessive load from being exerted to the hearing aid H at the time of applying the hearing aid H to the brush 2.

[047] As shown in FIG. 2, the second embodiment of the device for removing earwax is comprised of a cylindrical case 1 having a bottom, a brush 2 accommodated in the case 1, a cylindrical case 3 having a bottom, and a liquid retaining member 4 for a cleaning liquid accommodated in the case 3. The liquid retaining member 4 is made of a porous and soft material such as sponge so as to absorb a cleaning liquid. As for the cleaning liquid, volatile liquid such as disinfecting alcohol is preferable.

[048] By increasing the thickness of the liquid retaining member 4, it is possible to provide a recessed portion (not shown in the drawing) corresponding to the shape of the hearing aid H in the upper surface of the liquid retaining member 4. Additionally, a lid may be provided for the cases 1 and 3.

[049] In operation, a user applies the earwax guard tip C to the liquid retaining member 4 which has absorbed disinfecting alcohol, and lets the alcohol soak into the earwax. In the case of providing the recessed portion (not shown in the drawing) corresponding to the shape of the hearing aid H in the upper surface of the liquid retaining member 4, the surface of the hearing aid H can be cleaned by the alcohol at the same time when the alcohol is allowed to soak into the earwax adhering to the earwax guard tip C.

[050] Next, the user holds the hearing aid H, applies the earwax guard tip C to the brush 2 from above, and rubs the earwax guard tip C against the brush 2 while moving the hearing aid H back and forth, left and right, or circularly, so as to remove the earwax from the earwax guard tip C.

[051] Even clotted earwax can be removed easily because the earwax becomes soft by absorbing the alcohol. In this instance, since the sound emission port of the hearing aid H faces downward, it is possible to prevent the earwax removed from the earwax guard tip C from entering the inside of the hearing aid H through the earwax guard tip C.

[052] As shown in FIG. 3, the third embodiment of the device for removing earwax is comprised of a cylindrical case 5 having a bottom, a brush 2 and a liquid retaining member 4 for a cleaning liquid, both of which are accommodated in the case 5. The liquid retaining member 4 absorbs disinfecting alcohol. A lid may be provided for the case 5.

[053] FIG. 3 (a) shows an example where the brush 2 and the liquid retaining member 4 are accommodated in the case 5 which is divided in the center by a partition plate 5a. Alternatively, the brush 2 and the liquid retaining member 4 may be accommodated in the case 5 in parallel without using the partition plate 5a. FIG. 3 (b) shows an example where the brush 2 is formed in a doughnut shape onto the liquid retaining member 4 which is accommodated in the case 5.

[054] As shown in FIG. 4, the fourth embodiment of the device for removing earwax is comprised of a brush 2, a case 6 for accommodating the brush 2, a liquid retaining member 4 which absorbs disinfecting alcohol, and a case 7 for accommodating the liquid retaining member 4, in which the case 6 forms an upper case and the case 7 forms a lower case. When the cleaning device is used, the upper case and the lower case are separated. When the cleaning device is not used, the upper case and the lower case can be a unitary case.

[055] Both of the third embodiment and the fourth embodiment enable users to easily remove earwax from the earwax guard tip C in the same manner as the second embodiment.

[056] As shown in FIG. 5, the fifth embodiment of the device for removing earwax is comprised of a liquid retaining member 4, a brush 2 which is formed by arranging a hair structure directly in the surface 4a of the liquid retaining member 4, and a case 5 for accommodating them.

[057] Since the brush 2 is formed by arranging a hair structure directly in the liquid retaining member 4, disinfecting alcohol in the liquid retaining member 4 can be transmitted upward along the hair structure of the brush 2. Therefore, when a user applies the earwax guard tip C to the brush 2, and moves the hearing aid H back and forth, left and right, or circularly, earwax adhering to the earwax guard tip C can be removed easily while being soaked with the alcohol.

[058] As shown in FIG. 6, the sixth embodiment of the device for removing earwax is comprised of a brush 2, a liquid retaining member 4, and a case 5 for accommodating them, in which the thickness of the liquid retaining member 4 is large enough to make a recessed portion 10 having a column shape whose diameter is larger than the outer diameter of the hearing aid H in the center of the liquid retaining member 4, and the brush 2 is formed by arranging a hair structure directly in the bottom surface 10a of the recessed portion 10.

[059] Since the recessed portion 10 having a column shape whose diameter is larger than the outer diameter of the hearing aid H is provided in the liquid retaining member 4, and the brush 2 is formed by arranging a hair structure directly in the bottom surface 10a, the surface of the hearing aid H can be cleaned by the alcohol at the same time when earwax adhering to the earwax guard tip C can be removed by the brush 2 while being soaked with the alcohol.

[060] As shown in FIG. 7, the seventh embodiment of the device for removing earwax is comprised of a brush 2, liquid retaining members 4, and a case 5 for accommodating them, in which the liquid retaining members 4 are provided in the center of the case 5 and in the inner peripheral side of the case 5, and the brush 2 is provided in an annular groove 11 which is defined between the liquid retaining members 4. The brush 2 is arranged in an annular shape.

[061] In operation, a user applies the earwax guard tip C to the liquid retaining member 4 which has absorbed disinfecting alcohol, so as to allow earwax adhering to the earwax guard tip C to be soaked with the alcohol. Next, the earwax guard tip C is slid along the annular groove 11 while being pushed onto the brush 2, so that the earwax adhering to the earwax guard tip C can be easily removed.

[062] The above-mentioned cases 1, 5, and 6 may be fixed to a vibration driving means (not shown in the drawing) so as to undergo periodic movement such as vibration, horizontally-rotating movement, horizontally-reciprocating movement or horizontal and two-dimensional movement in a state where the earwax guard tip C is pushed onto the brush 2. In addition, if the vibration driving means has a timer, it becomes possible to conduct cleaning with the brush for a reasonable period of time.

[063] As shown in FIG. 8, the device may comprise a brush 12 of a column shape, and the brush 12 may be attached to a rotation driving means 13. The brush 12 is rotated around the rotation axis 12a, and the rotated brush 12 is pushed onto the earwax guard tip C, so that earwax adhering to the earwax guard tip C can be removed easily and quickly.

[064] Also, a member for wiping the alcohol which adheres to the surface of the hearing aid H such as disposable paper tissue after the cleaning may be provided in the cases 1, 3, 5 and 6 or the lids of the cases 1, 3, and 5. With this, it is possible to keep the hearing aid H clean, and a user can wear the hearing aid H immediately.

[065] A magnifying glass may be provided in a reverse surface of the cases 1, 3, 5, 6 and 7 or the lids of the cases 1, 3, and 5, which enables a user to see the state of the earwax guard tip C while being magnified. With the provision of the magnifying glass, a user can easily check whether the earwax has been removed from the earwax guard tip C or not after the cleaning.

[066] Also, if a liquid feeding means is provided (not shown in the drawing), disinfecting alcohol can easily be fed to the liquid retaining member 4. Further, a vacuum means may be provided (not shown in the drawing), so as to remove earwax adhering to the brush 2 and the liquid retaining member 4 by suction after being used.

[067] The device of the present invention can be accommodated in a hearing aid drying case or a hearing aid carrying case (not shown in the drawing). With this, cleaning can be conducted whenever it is needed.

[068] As shown in FIG. 9, the eighth embodiment of the device for removing earwax is comprised of a cylindrical case body 21 having a bottom, a lid 22, and a brush 24 accommodated in the lid 22, in which the cylindrical case body 21 and the lid 22 forms

a case 23. Since a sealed space is formed within the case 23 by covering the case body 21 with the lid 22, sponge or cotton absorbing a cleaning liquid such as disinfecting alcohol can be accommodated in the case body 21 in a state of keeping the cleaning liquid from being volatilized easily.

[069] The brush 24 is formed by arranging a hair structure in a base 25 which is attached to the lid 22. The tip of the brush 24 is projected from the edge of the lid 22. Alternatively, the brush 24 may be formed by arranging a hair structure directly to the lid 22. In addition, a flexible member (not shown in the drawing) may be provided between the lid 22 and the brush 24 so as to function as a cushion.

[070] The hair structure of the brush 24 is made of a fine member so as to remove earwax which adheres to small holes of the earwax guard tip C installed in a sound emission port of the hearing aid H. The hair structure of the brush 24 has an appropriate length so as not to enter the inside of the hearing aid H more than needed through the holes of the earwax guard tip C. The hair structure of the brush 24 also has appropriate strength so as not to exert more force than needed to the earwax guard tip C.

[071] In order to remove earwax from the earwax guard tip C, a user holds the hearing aid H, applies the earwax guard tip C to the brush 24 from above, and rubs the earwax guard tip C against the brush 24 while moving the hearing aid H back and forth, left and right, or circularly.

[072] In this instance, since the sound emission port of the hearing aid H faces downward, it is possible to prevent the earwax removed from the earwax guard tip C from entering the inside of the hearing aid H through the earwax guard tip C. Also, by providing the flexible member between the lid 22 and the brush 24, it is possible to prevent excessive load from being exerted to the hearing aid H at the time of applying the hearing aid H to the brush 24. Moreover, by projecting the tip of the brush 24 from the edge of the lid 22, user-friendliness can be achieved.

[073] As shown in FIG. 10, according to the ninth embodiment of the device for removing earwax, a brush 28 is provided in the case body 21 in addition to the brush 24 provided in the lid 22. The other elements and the function thereof are the same as the

case of the eighth embodiment.

[074] The hardness and the thickness of the hair structure of the brush 24, and the hardness and the thickness of the hair structure of the brush 28 may be different from each other. For example, by adjusting the brush 28 of the case body 21 to be harder than the brush 24 of the lid 22, it is possible to use the more appropriate one depending on the degree of the earwax.

[075] As shown in FIG. 11, according to the tenth embodiment of the device for removing earwax, an anti-slip member 30 is attached to the outer top surface of the lid 22 and the outer bottom surface of the case body 21. The material and the shape of the anti-slip member 30 is selected so as to exert friction with respect to a table or the like where the case body 21 and the lid 22 are put for conducting earwax removal. Examples of the material include rubber, resin, and cork, and examples of the shape include a sheet shape and a rough surface.

[076] In order to remove earwax from the earwax guard tip C, a user holds the hearing aid H, applies the earwax guard tip C to the brushes 24 and 28 from above, and rubs the earwax guard tip C against the brushes 24 and 28 while moving the hearing aid H back and forth, left and right, or circularly.

[077] In this instance, removal of earwax adhering to the earwax guard tip C can be easily conducted because the lid 22 or the case body 21 is prevented from slipping on the table due to the anti-slip member 30 attached to the outer top surface of the lid 22 and the outer bottom surface of the case body 21. The other elements and the function thereof are the same as the case of the ninth embodiment.

[078] The anti-slip member 30 may also be attached to the outer peripheral surface of the case body 21. With this, when a user holds the case body 21 to conduct earwax removal, the user can surely hold the case body 21, and thereby conduct earwax removal steadily.

[079] In addition, the anti-slip member 30 can be provided with letters or a picture thereon, the anti-slip member 30 can function as a displaying means as well as an anti-slip means.

[080] As shown in FIG. 12, according to the eleventh embodiment of the device for

removing earwax, the case body 21 is divided into a brush accommodating section 31 and a cleaning member accommodating section 32. A brush 33 is provided in the brush accommodating section 31, and a cleaning member 34 such as sponge or cotton absorbing a cleaning liquid such as disinfecting alcohol is provided in the cleaning member accommodating section 32.

[081] By accommodating the brush 33 and the cleaning member 34 in the single case body 21, it is possible to conduct earwax removal efficiently with both the brush 33 and the cleaning member 34 such as sponge or cotton absorbing a cleaning liquid such as disinfecting alcohol. The other elements and the function thereof are the same as the case of the tenth embodiment.

[082] In the above-described embodiments, the shape of the cases 1, 3, 5, 6, 7, and the case body 21 is a cylindrical shape having a bottom. However, it is not limited to such a shape, and another shape such as a rectangular box shape can be used.

Industrial Applicability

[083] According to the present invention, it is not necessary to replace an earwax guard tip, and also a user can remove earwax from the earwax guard tip easily on his/her own. Therefore, user-friendliness can be improved, which allows a hearing aid to be widespread.